

Open Education 2030

Call for Vision Papers

School Education

The Open Mind

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Students and teachers will continue to go to the school down the road; and they'll begin to go to the school in the cloud.

Abstract

Modern networked technologies and open information sources mirror the workings of the human mind. As we individually remake our memories and ourselves, so does society continually remake our collective mind. Human knowledge is no longer encyclopaedic, but wikipedic – flowing and networked, not fixed and static. It begins to resemble Hegel's Absolute Mind: collective, self-knowing, free from the limitations of human institutions. Despite this, modern education paradigms belong to the era of the empire and the encyclopaedia. Schools are organized bureaucratically in the image of artisanal workshops or factories; teachers are agents of a central knowledge and authority. These forms are implemented with varying levels of success. They are also obsolete.

By 2030 new paradigms of education will reflect our understanding of knowledge as in flux throughout a collective mind. Familiar technologies that facilitate social-networking and user-generation of content will support the education of all. Learners will engage independently with a single self-organizing learning environment – the Open Mind – through web-enabled devices. They will still attend schools, but radically altered and inside out. Here they will engage in collaborative learning projects, receive guidance and socialize. Crucially, we will not lose the essential teacher-student or student-student learning relationship.

Teachers will be problem-setters, bricoleurs, consultant physicians, and analysts. They'll work with the Mind to sculpt assessments and diagnose student learning needs, mediating learner experiences through the creation, discovery or adaptation of content. The cloud will grow, facilitating the access of any learner, anywhere to all of the highest rated content. Access to the best learning will no longer depend on socioeconomic factors.

In creative symbiosis with the Open Mind will be an eco-system of pedagogical research. The cloud interactions of both students and teachers will generate a growing data set, allowing analyses of approaches at previously unimagined scales. This evidence-base will drive constant evolutions in the role and effectiveness of the learner, teacher, school and Mind.



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“When it was announced that the Library contained all books, the first reaction was unbounded joy.”

Jorge Luis Borges, *Ficciones*

Current forms of schooling are artisanal and obsolete

In *Race Against the Machine* (Digital Frontier Press, 2011) Erik Brynjolfsson and Andrew McAfee describe the idea of General Purpose Technologies that interrupt and accelerate the normal march of economic progress and have inherent potential for technical improvement, getting better over time. Computers, especially when combined with networks and called ICT, are GPTs. Though this technology exists, it has not yet been intelligently applied to school education.

Clay Shirky uses the example of the string quartet to illustrate the shortcomings of the current education model. In ‘Napster, Udacity and the Academy’ he writes that ‘Performing a 15-minute quartet took a cumulative hour of musician time in 1850, and takes that same hour today.’ He calls this problem ‘cost disease’, and in school education it sees a teacher in a room with thirty-or-so students, lessons organized in equal sized blocks of time throughout the day, ‘an artisanal product, created from scratch, on site, real time.’ But like music, the model of education can be transformed: ‘the biggest change... has come not from production but playback... the vast majority of music listened to on any given day is no longer recreated live.’ He could add – and it is no longer individually owned.

By 2030 a new understanding of school education will exist.

A time of new technologies is a time of new idealisms. Education needs new utopias. The early socialists of the nineteenth century envisaged new societies based on the technological advances of their day. Their utopias – built around concepts of mechanization, efficiency and leisure – were deeply concerned with mass education and still heavily inform our current school models (as Ken Robinson argues). Our thinking about schools in the twenty first century should channel their imaginative power. But rather than imagine units organized around production, as in Fourier’s *Theory of the Four Movements* or Owens’ *New View of Society*, we need forms based on the open exchange of learning for all.

At the centre will be the Open Mind.

We can sense in the cloud technology that enables users to hear, share, individualize and adapt music content an echo of a future era of learning: the Open Mind. A network of open content, software, resources and data accessible to all, it will be – like human mind – in continual evolution. Where the learner of today builds skills, acquires information and memorizes static curricula created by schools, districts or national government, the learner of 2030 will lead their own interactions with this self-organizing learning cloud.

Pockets of progress point already to this future. Project Gutenberg, Open Shakespeare (an interactive and open content site of criticism and scholarship) and Textus (enabling users to annotate and share comments on digitized public domain texts) are changing academic learning, pioneering new forms of curriculum and breaking down the borders of knowledge. Sugata Mitra goes further, calling knowledge obsolete. Static knowledge is. In the Open Mind knowledge will be dynamic and – in the understanding of Finnish pedagogical practice – only

understood as knowledge if it can be communicated. In the Open Mind, knowledge is learning.

Learners will engage directly with the self-organizing Open Mind

Every learner will have unrestricted access to the Open Mind, either through a personal device or one issued by a school. Through his ‘Hole in the Wall’ projects, Sugata Mitra showed the causal relationship between access and learning (and rapid growth in that learning where the access was loosely guided by mechanisms in the learning environment, and facilitated by a guide). He labels the world beyond the interface the Self Organizing Learning Environment (SOLE), and envisages the eventual networking of these environments into a single ‘school in a cloud’ connecting all learners to experiences, peers and teachers.

The Open Mind of 2030 will be a SOLE that learns and adapts itself to the needs of its user learners. Gaming software is showing how this might happen. Zynga gathers information on a player’s behaviour in a game and uses that data to moderate the experience in real time and to tailor future experiences to the player’s preferences. Some educational software can already sense when students “are having difficulties and need more detail, repetition, and perhaps a slower pace” (Brynjolfsson and McAfee), while programs like Udacity, Coursera and edX all track the web interactions of students to evaluate the pedagogical success of the content, providing data and feedback to students and their professors. By 2030 the Open Mind will offer educational content perfectly differentiated to a student’s learning ability and adapting to them as they progress.

Though small schools will remain the primary interface of education

Higher education is already seeing the application of new models of enrolment. Classic elite universities guarantee high graduation rates, but are expensive and inaccessible to the majority of students. MOOCs are beginning to allow cheap online access to a high standard of education for lots of people, but only a small percentage of them are completing courses. Hybrid models, involving lightweight additional support alongside a MOOC, can result in better graduation rates, so open-minded universities are beginning to offer these. The schools of the future will follow this model. Whilst learners will have access to the school in a cloud that is the Open Mind, students will still gather in schools. Society must still be accountable for the education of all of its children.

The best way to achieve this will be through small schools built around socializing and group work. Human relationships are central to a child’s development, and schools will encourage these. To better meet student needs, the day won’t be divided into equal sized lessons which students attend with 30 other students, but will more closely match the best forms of delivery. So students might watch lectures individually or in whole school groups. They might use individual time to practice – in which case they may need no more than a supervisor. With automated differentiation, teacher time would be freed up. School leaders won’t organize teams of subject generalists, but will find new ways to differentiate and specialize their teaching capacity.

The role of the teacher will be radically altered

Teachers will not be eliminated. They’ll continue to create, facilitate and manage learning interactions, but hybrid models will enable each teacher action to be more creative, more productive and more accessible (both for kids in that school, and those beyond). In 1997 humanity’s best chess player, Gary Kasparov, lost to Deep Blue, the computer developed by a

team from IBM. But a new form of competition pits any combination of human and computer teams against one another – the 2005 competition was won by two amateur chess players using three computers. They beat grandmaster opponents and participants with much greater computational power. As Brynjolfsson and McAfee explain, ‘weak human + machine + better process was superior to a strong computer alone and... to a strong human + machine + inferior process.’

Principles of hybridity and process management will be central to the teacher’s role in 2030: not technology or teachers, but teachers made more effective by technology. Some of these principles are applied in schools already. The ‘flipped classroom’ (or ‘time-shifted teaching’) buys back hours of lesson time over the course of a week by shifting teaching outside of class time through lectures made available through Youtube or DropBox and questions posed on Twitter. Within the school they will be disruptors, setting open-ended tasks, assigning project briefs and giving guidance. They’ll coach students one-one, or facilitate small group learning and collaboration.

Teachers may develop specialist responsibilities for aspects of practice. They might lead on assessment, design of group pedagogy, or the creation of lecture content. Increasingly, they will cease to be generalists. A senior consultant teacher might wander the corridor providing guidance to junior teachers, carrying out video observation, working with high need groups of students. The culture would be one of continual improvement.

Teachers will create, find and find-and-adapt content

The availability of (and ability to adapt) content – whether photos to use as historical sources or quizzes created by other teachers – is one of the most obvious benefits of the internet. Jake’s mother, a teacher, used to cut up magazines to create worksheets. She’d use them once, and perhaps share them with the handful of teachers in her school. Today teachers can create, assess and administer a homework quiz using a free tool like SurveyMonkey, uploading it to an open platform so that it can be used and adapted by other teachers. OER and the TES Resource site are already attempting to aggregate this kind of tool.

By 2030 adaptations, mash-ups and *bricolages* will be the norm. Content in the Open Mind will constantly evolve as teachers (and students) use, add-to or adapt it for new learning needs, inviting peer-review and providing evidence of learning results. Picture Sal Khan’s Academy, constantly updated and adapted with the best lectures, lessons and learning activities by educators around the world, or Michael Sandel’s lectures, mashed up and annotated by a succession of students and teachers. Teachers will save time cutting up magazines, and spend it doing more of what they uniquely placed to do.

Data will be collected, shared and analysed to the benefit of all

Increasing amounts of useful data about all students, teachers and teaching resources will be generated for individuals, schools or the system. When a teacher gives a SurveyMonkey test, the results will be recorded. As these results are recorded over time an open data-set will emerge permitting an analysis of trends. Open source data visualization software will be used to provide high quality information to the student, teacher and parent about progress in the student’s learning. The Big Data that is produced will allow educators to extract new insights or create new forms of value.

In health, the benefits of this are already being seen. Brynjolfsson and McAfee (2011) explain how the ‘the Main Star Washington hospital Centre in Washington DC working with Microsoft research analysed several years of its anonymised medical records...for ways to reduce readmission rates and infections... the system also spotted another unexpected top

predictor [of patient readmission]: the patient's mental state.' It's not difficult to imagine a similar early warning system might have application in education, to monitor those at risk of dropping out of school. In fact just such a project is being developed by WCET, funded by a \$1m Gates Foundation grant.

A research eco-system will drive new learning practice

This potential for research in education is long overdue. Alex's mother is a teacher. She is currently excited about Howard Gardener's theory of Multiple Intelligences (1983), first published thirty years ago, and only now reaching her classroom. Research findings travel slowly in the world of education. There are also very few of them. In the UK, scientist Ben Goldacre has published a paper for the Department of Education making the case for the use of randomized control trials to drive up the quality of student learning in the way that they have been used to improve health outcomes in hospitals. The open data and evolving content generated by students and teachers would be at the heart of the 'eco-system of research' that he holds to be necessary to generate meaningful insights about best practice. Through data-sharing, we'll build research networks where teachers submit research questions and academics manage randomized trials of particular activities or pedagogical approaches. Trends analyses will facilitate data-driven decision-making at the school or system level. Research results will be disseminated, accessed and acted upon by teachers throughout the network.

The system will facilitate a virtuous cycle of teacher development

Research has shown that teachers don't get much better over time. Some people feel that this is because teaching is about innate talent. We believe it's due to the fact that they're not getting enough training. The training they are getting is not of the right kind. Open Education can support teacher development so that teachers do get better with time. Teaching is a performance profession. The best way to get better at it is to do it (and receive feedback) or to watch others doing it (and provide feedback). Ideally, teachers would receive feedback in every lesson – just like their students. But this is impractical – it requires two teachers to be present, and teacher time is of premium value. But as we saw with the string quartet, playback technology will let us change the model.

In 2030, teachers will record all of the activity that takes place in their classrooms (along with the record of the content that they have created and adapted – and the ensuing learner interactions). At the end of each day they'll select and upload onto an open resource platform small segments of that day's teaching that were particular successes or challenges, tagging them with key words. With a formal coach in the school, or an informal peer in the cloud, the teacher will then debrief the teaching episode, and perhaps watch videos of others successfully executing similar tasks, providing feedback in comment form or via Skype.

Over time, this open teacher development forum will grow (in symbiosis with the content of the Open Mind and the eco-system of research – one can envisage the integrated whole). Teaching segments could be rated by other professionals or ranked according to views. A taxonomy or sense of the collective understanding of best practice will slowly emerge and evolve over time through the process of upload, tag, watch, feedback, rate. Teachers, not inspectors, will own the profession. Students will engage as learners with the best content to make the teacher's reach truly global. They will offer feedback to increase quality. The School in the Cloud will grow and grow.

Learning will be local, global and open.

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